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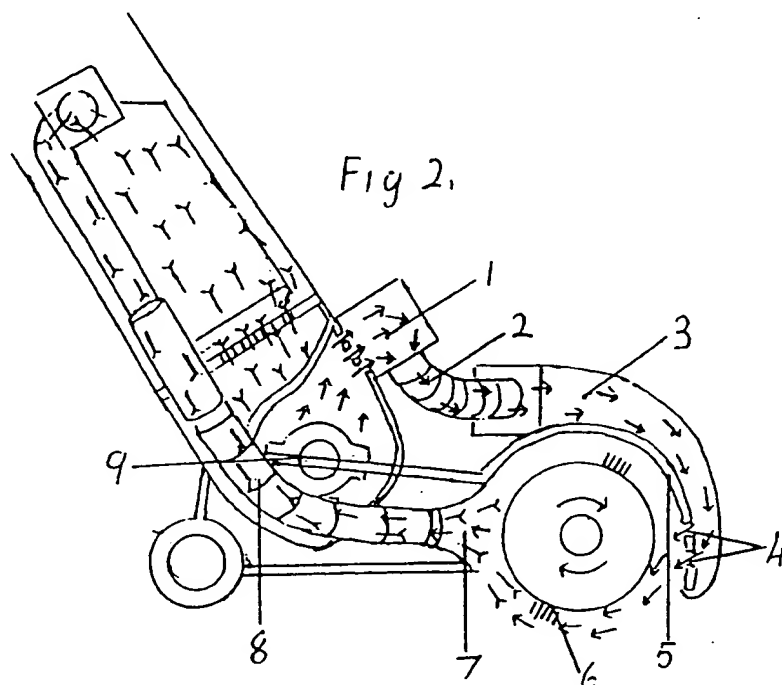
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GB 2277677 A GB 1418635 A GB 0732972 A
EP 0430415 A1 US 4393536 A

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(54) Vacuum cleaner airflow assembly

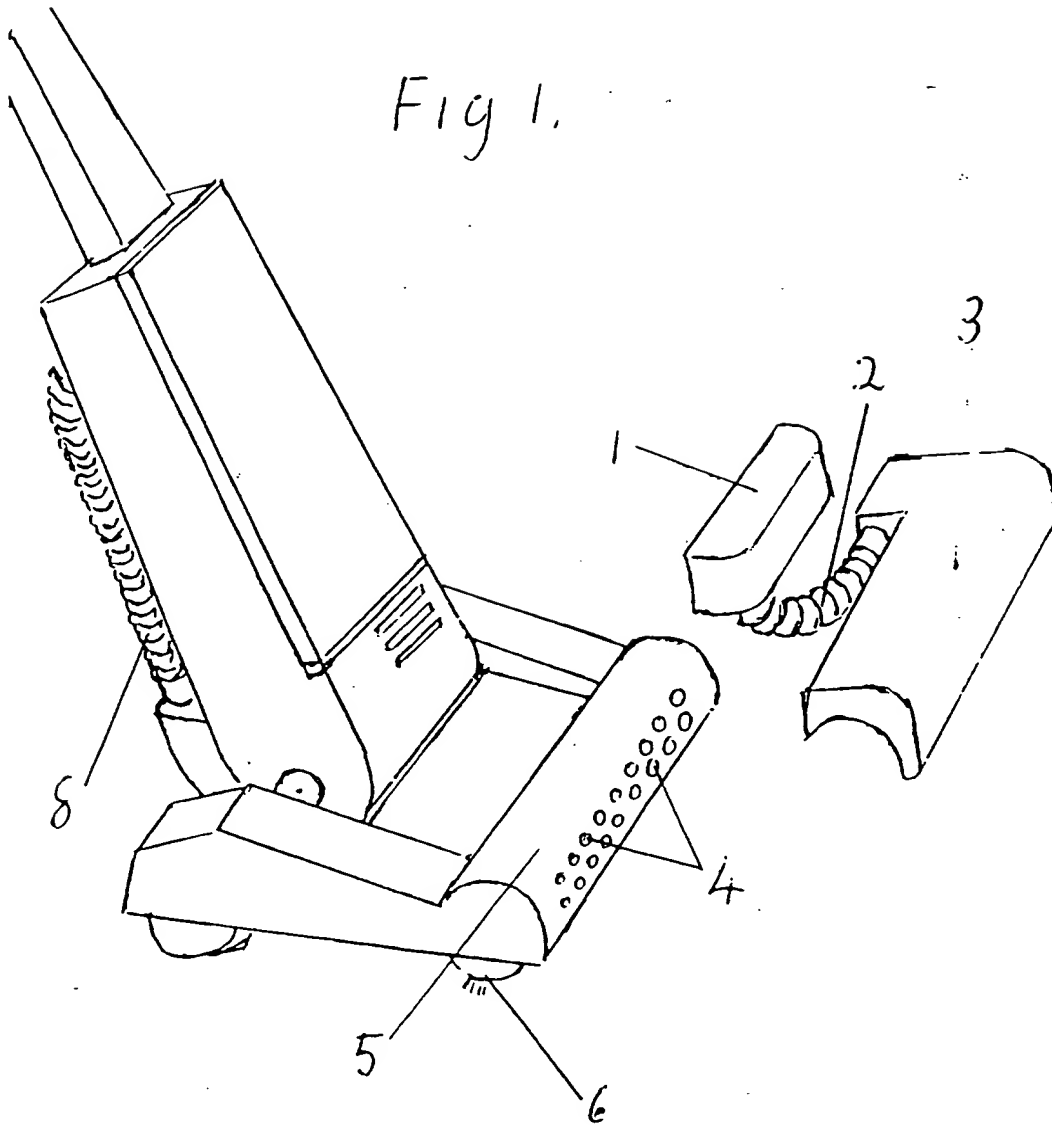
(57) An air-flow assembly consists of an expansion box 1, flexible hose 2, and a cowling 3 connected to the air exhaust outlet of a vacuum cleaner. The exhaust is directed through holes 4 evenly over a rotary brush 6 and assists the rotary brush to remove dirt from the object being cleaned, the dirt then being drawn into air intake 7. Excess heat is removed from the exhaust in the expansion box 1. The cleaner may be an upright cleaner of the type that has the fan and motor located in the upright part of the machine with the cowling on the base and the expansion box on the upright, connected so as not to restrict the movement of the cleaner. The assembly may be part of the cleaner housings or separately attached components. The hose may be replaced by a rotating or sliding coupling.



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1/2,

Fig 1.



2/2,

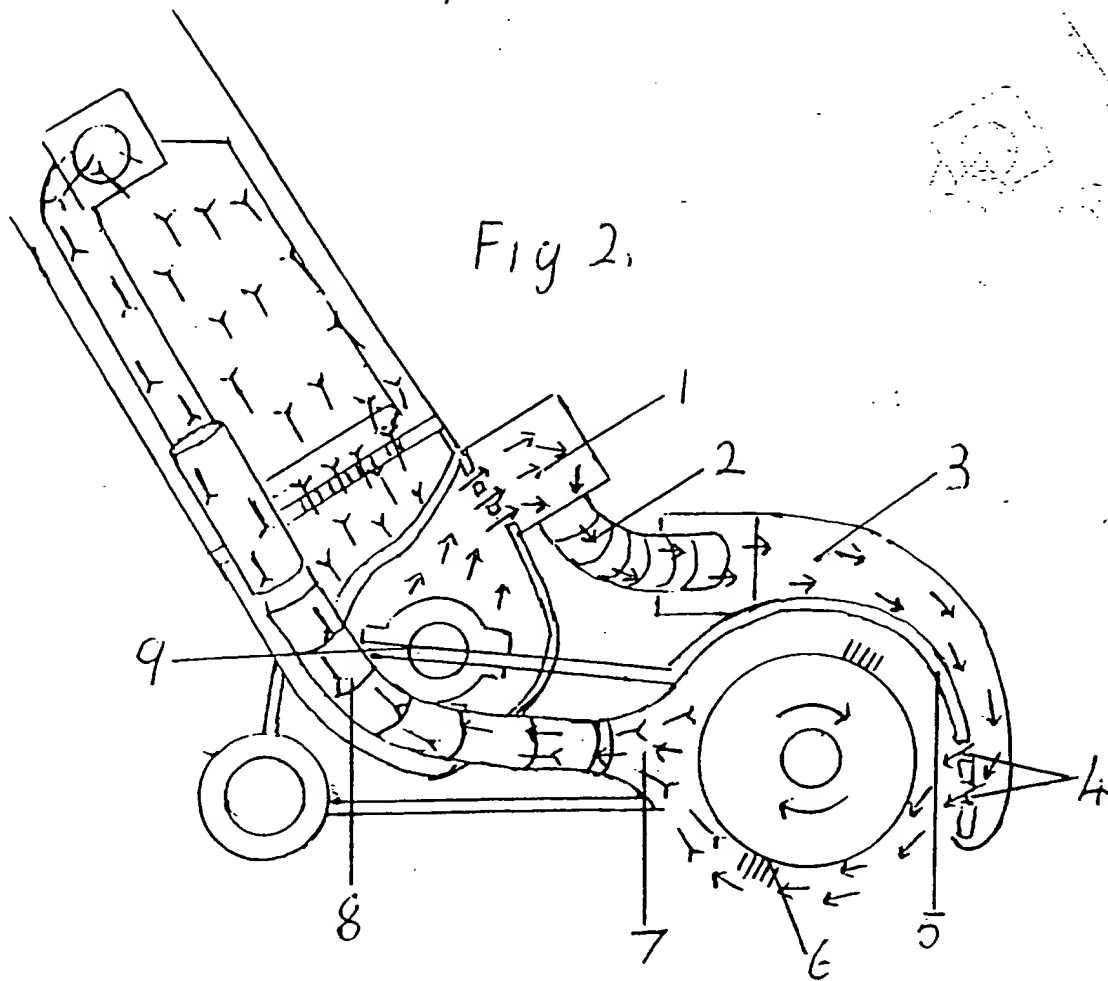
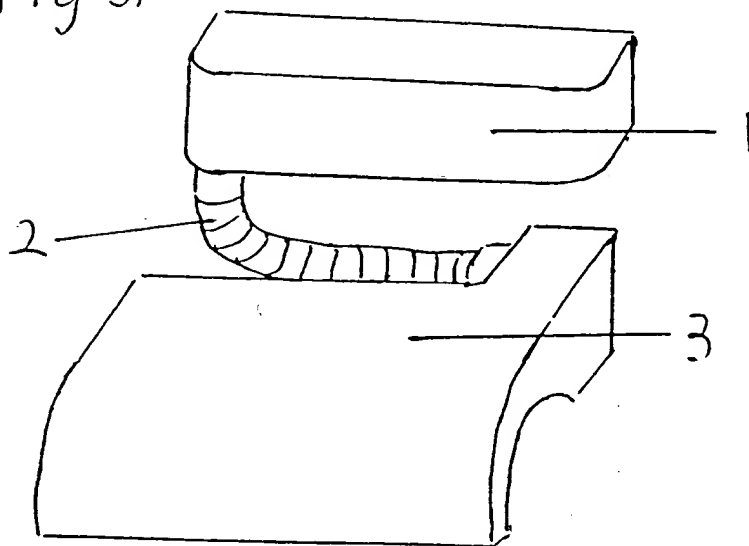


Fig 3,



" A VACUUM CLEANER AIR-FLOW ASSEMBLY "

This invention relates to upright vacuum cleaners of the type that have the motor and fan remotely located from the dust inlet and attached to the upright part of the cleaner, just beneath the dust bag container.

In some well known designs of upright cleaners the exhaust air is allowed back into the surrounding atmosphere taking with it any dust that may have escaped from the dust bag. extra filters are sometimes added but they further reduce the efficiency of the machine.

There are also vacuum cleaners of other types where the exhaust air is returned to the cleaning head but it has been usual to release part of the air through a valve and in one case to use the air pressure to drive a turbine which in turn drives the rotary brush.

It is the object of the present invention to make use of all of the exhaust air by using an assembly of parts. First an expansion chamber or Box 1/ which is used to allow the warm exhaust air to expand and to remove excessive heat from the air it also serves to channel the air-flow to the opposite side of the machine.

A flexible hose 2/ that takes the air from the expansion box across to the inlet of an air-flow cowling 3/ in such a way that the flexible hose will lie horizontally when the machine is parked and be of sufficient length to allow the handle to swivel down to the floor when the cleaner is in use under a low object or chair.

The purpose of the air-flow cowling 3, is to allow more expansion of the air and to channel the air-flow to holes that are placed in the housing of the rotary brush to allow the air-flow to blow on to the rotary brush evenly across its width. The air-flow is then taken up in the motion of the brush and assist in removing and driving any dust and dirt that it may encounter on the object being cleaned into the suction orifice where the pulling power of the air is combined with the pushing power of the brush and the returned exhaust air-flow .

The dust laden air is drawn into the dust container, to deposit most of the dust and dirt that is suspended in the air-flow into the dust bag. Now the air is drawn through the inlet of the fan which then blows the air back through the motor housing to cool the motor and then out once more into the expansion box to repeat the process over again. some added advantages are that,

Any fine dust particles germs and smells that are suspended in the air flow are contained within the machine,

There is a reduction in noise level coming from the cleaner, The air which is still warm when it reaches the carpet helps to dry a damp carpet .

The energy from the exhaust air is returned to the system which increases the efficiency of the machine,

It is the object of the invention to provide a way in which all of the exhaust air can be used to assist in the cleaning of a carpet or other object by using the three parts that make up the air flow assembly, and to achieve this in a way that does not restrict the swivel action and flexibility of the vacume cleaner.

An alternative to separate parts for the air-flow system is to make the box and cowling, as extensions to the vacuum cleaner motor and base units.

A specific embodiment of the invention will now be described by way of example only, with reference to the accompanying drawings, in which:

Figure 1, is a perspective view of a vacuum cleaner, with the air-flow assembly shown detached,

Figure 2 shows the an impression of the air-flow of the invention with arrows pushing → and pulling ↗

Figure 3 shows the three major components of the Air Flow Assembly,

Referring to the drawings the air flow assembly comprising of an expansion box 1, which when attached to the cleaner at the outlet of the exhaust allows the air to expand and also removes some of the excess heat and disipates it in the surrounding atmosphere through the casing cooling fins, or tubes,

The flexible hose 2, is attached to a flange on the box 1, on the opposite side to the inlet and at the bottom this is to allow the hose to lie in the space between the box 1, and the air-flow cowling 3, when the machine is at rest in a parked position, and to still be long enough to pull out when the cleaner is in use and allow the handle to swivel back.

The cowling 3, has a flange set in the side of a recess to take the hose 2, which receives the air flow from the box 1, the purpose of the cowling 3 is to present the air flow evenly to a row of holes 4, in the rotary brush housing 5, this air flow is then trained at the rotary brush 6, where it is taken up by the motion of the brush to assist in removing dirt and dust from the object being cleaned.

The rotation of the brushes within the air flow forcefully drive this dust and dirt back into the air intake 7, to be returned through the hose 8, up to the dust bag where most of the dust and dirt will be deposited. The air flow is now drawn back into the motorised fan 9, and blown out again into the motor housing to cool the motor and then back into the expansion box 1, to form a continuous flow of air as all of the air is contained within the system including the dust, dirt, smells and germs that are suspended in it.

As both the pushing and pulling influences of the fan are now combined the efficiency of the machine is considerably increased, and the machine would now be better described as a continuous air-flow cleaner instead of vacuum cleaner.

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CLAIMS

1/ A Vacuum cleaner air-flow assembly consisting of an expansion chamber or box attached to the air stream outlet of the vacuum cleaner, a cowling that is attached to the head or base of the vacuum cleaner and a hose which connects them together in a way that returns all of the air stream that is normally released into the room back to the rotary brush through a set of holes that are of a size and location that ensures that the air stream is spread evenly across the width of the brush, the air-flow or stream is then taken up in the motion of the brush and assist in driving any dust and dirt that it may encounter into the suction orifice were the pulling power of the fan is combined with the pushing power of the brush and the returned exhaust air-flow, the component parts are arranged in such a way that does not restrict the swivel action and flexibility of the vacuum cleaner.

2/ A Vacuum cleaner air-flow assembly as in claim 1 but constructed as parts of the vacuum cleaner motor housing and base mouldings instead of separately attached components.

3/ A Vacuum cleaner air-flow assembly as in 1 and 2 that is attached or moulded into the cleaner at the outlet of the cleaning fan on a machine in which the cleaning air and the motor cooling air are separated inside the cleaning fan and motor housing.

4/ A vacuum cleaner air-flow assembly as in claims 1 to 3 where the expansion chamber becomes a part of the fan housing.

5/ A vacuum cleaner air-flow assembly as in claims 1, 2 and 3, where the hose is replaced by a sliding or rotating hollow coupling to allow a free passage of the air stream from the expansion chamber and the cowling.

6/ A vacuum cleaner air-flow assembly where the cowling is replaced by ducting within the vacuum cleaner head

7/ A Vacuum cleaner air-flow assembly that makes it possible to contain within the machine all of the contaminated air that is being used to clean a carpet or other object..

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CLAIMS

8/ A Vacuum cleaner air-flow assembly that returns the energy that is normally allowed to escape with the exhaust air stream pressure, back to the inlet to assist in turning the rotary brush system in a way that will complement the suction of the cleaning fan.

9/ An air-flow assembly as in claims 1 to 8 that reduces the amount of noise that the vacuum cleaner can emit by muffling the sound within the various components.

10/ An air-flow assembly as in claims 1 to 9 that will allow a vacuum cleaner to be run efficiently at a greatly reduced power without stalling.

11/ An air-flow assembly as in claims 1 to 10 where the reclaimed energy that is returned to machine in the form of exhaust air pressure means that the motor does not have to labour so hard to do a given amount of work.

12/ an air flow assembly moulded of a single flexible plastic material to be attached to a conventional upright vacuum cleaner.

13/ an air-flow assembly concealed within the housing of a vacuum cleaner head and cleaning fan.

14/ A vacuum cleaner air-flow assembly as in claims 1 to 13 that will run on very low power and is suitable to use on machines that have adjustable speed motor control.

15/ A vacuum cleaner air-flow assembly substantially as described herein with reference to Figures 1-3 Of the accompanying drawings.

(The Search report)

Relevant Technical Fields (i) UK Cl (Ed.N) A4F (ii) Int Cl (Ed.6) A47L Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii) ONLINE: WPI	Search Examiner KARL WHITFIELD Date of completion of Search 29 SEPTEMBER 1995 Documents considered relevant following a search in respect of Claims :- 1 TO 15
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Categories of documents

X: Document indicating lack of novelty or of inventive step.	P: Document published on or after the declared priority date but before the filing date of the present application.
Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.	E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.
A: Document indicating technological background and/or state of the art.	&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
X,E	GB 2277677 A (EDGINGTON) see especially Figure 5	1 at least
X	GB 1418635 (TUP!) see especially Figures 1 and 2	1 at least
X	GB 732972 (ASBRINK & CO) see especially Figure 1	1 at least
X	EP 0430415 A1 (WILLIAMS) see especially Figure 8	1 at least
X	US 4393536 (TAPP) see especially Figures 2 to 4	1 at least

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).